

THE GRASS-CARRYING WASP, CHLORION (ISODONTIA) HARRISI FERNALD.

By PHIL RAU, Kirkwood, Mo.

One species of grass-carrier wasps, *Chlorion (Isodontia) auripes*,¹ is found in St. Louis County, occupying the old burrows of the carpenter bee, *Xylocopa virginica*, and using long antennaed grasshoppers for prey. Recently a sister species of southern nativity, *Chlorion harrisi*,² with similar habits was taken at Wickes, Missouri. One nest of the latter, in an upright hollow stem, was placed in my back yard where it gave forth five adults and where its progeny thrived for three successive years. An examination at the same time of about 200 other dried stalks nearby gave no additional nests.

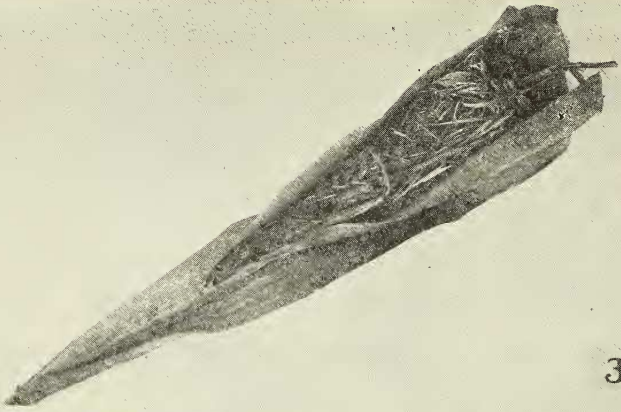
In my garden the progeny of this one colony readily nested in the horizontal and vertical hollow stems and in the glass tubes that were set out for them. In addition they also used the horizontal burrows in boards that had been abandoned by the carpenter bee, *Xylocopa virginica*.

It is interesting to note that most of the members of the genus *Chlorion* dig their burrows in the soil, and according to Dr. Bequaert (*Bull. Brooklyn Ent. Soc.* 25: 122, 1930) only four species in America and one in Europe have so far strayed from the primitive habits as to select pre-existing cavities for their nests. Grass carrier wasps use blades of grass, which they press into a compact plug and use for partitioning the long tunnel into cells; when the cells are completed they use the same material for plugging the entrance opening. These blades of grass are carried in the jaws one at a time, as may be seen in fig. 1. This photograph shows a mother *C. harrisi* at the opening of the nest with a long strand of grass. Fig. 4 shows the nest of the same species in one of the glass tubes that had been set out for their use; here the paper covering which kept the tube dark is partly pushed back, and shows among the grassy bed a cocoon of this wasp.

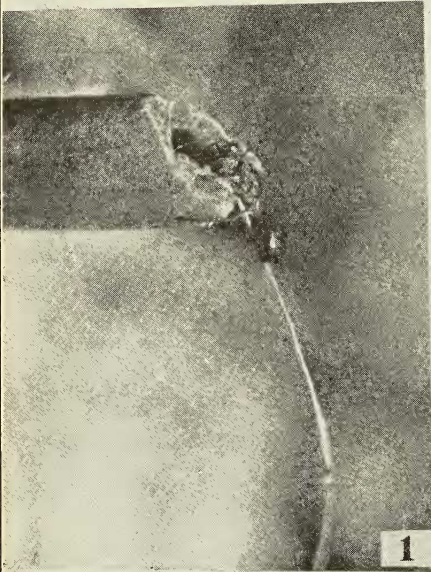
The prey of *harrisi* are the long-antennaed orthoptera similar to those taken by *C. auripes*. These are paralyzed by stinging, and held under the body while the wasp flies to the nest. In the nest an egg is deposited on one of the grasshoppers and in this species it

¹ An account of *C. auripes* may be found in *Trans. Acad. Sci. St. Louis* 25: 362-369. 1928.

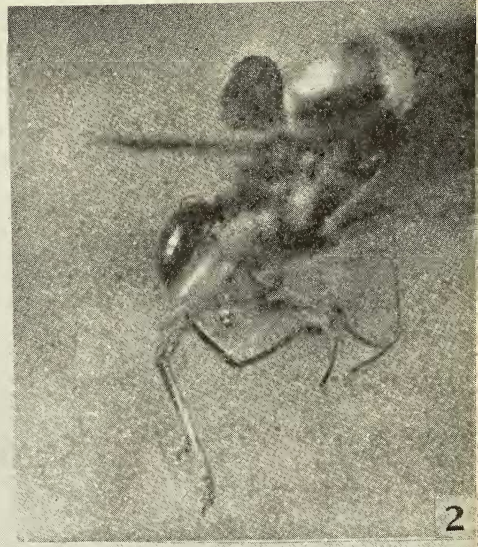
² Identified by Dr. Grace Sandhouse.



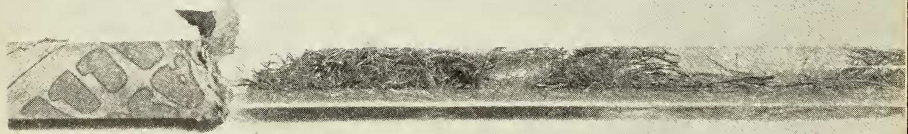
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is cemented on the femur of the left hind leg, where it cannot readily be lost or injured.

Fig. 2 shows a mother struggling to get a large many-legged prey into her nest. The prey taken is not always so large, however, for often small insects are captured; usually the smaller the size of the prey, the larger the number in each cell. For instance, on June 6, 1930, in two cells, two and one-half inches and two inches in length, thirty-two and thirty-eight individuals were counted. All but five were nymphs in the first instar, and all were, according to Mr. A. N. Caudell, of one species belonging to either the genus *Orchelimum* or *Conocephalus*. The five larger ones referred to were identified by him as belonging to two species, *Scudderia* sp. and *Conocephalus* sp. In addition to these, on one occasion a male snowy tree-cricket *Oecanthus 4-punctatus* Bueten., was taken from an incoming *harrisi* mother. The latter seemed dead when taken but next day it revived sufficiently to slowly move the legs and antennae when touched, and it was also able to pass excrement. It continued to do all this until its death nine days later. Mr. Geo. Engelhardt records (Bull. Brooklyn Ent. Soc. 28: 269-271, 1928) *harrisi* in Texas storing spiny katy-dids *Rehnia spinosa* sometimes measuring three to four inches in length, and in nests brought to me by my wife from Tifton, Georgia, September 1, 1932, I found four small nymphs of both sexes of *Conocephalus fasciatus* Degeer (A. N. Caudell).

The nesting habit of *harrisi* is sufficiently plastic so that they easily make use of any ready-made domicile, and the mother wasp always cleans out the old burrow before she begins her own nest; sometimes she kicks out the debris and lets it fall to the ground and sometimes she pushes it back in the horizontal twig as far as it can go, before she brings in her own nesting material. Grass plugs at the opening and partition plugs in the tunnel vary in size, but they are usually from one-fourth inch to two inches thick; sometimes the partition plugs are definitely plugs and sometimes they are mere bundles of grass upon which the prey with egg is placed. Engelhardt found this species nesting in the tubes formed by the folding of the yucca leaves in the drying process, and at Tifton, Georgia, they make good use of the pitcher plant for nesting purposes. My wife found hundreds of wasps nesting in this manner at Tifton, Georgia; and fig. 1 illustrates one such pitcher opened to show the nest. Specimens of the pitcher plant were identified by Dr. Edgar T. Wherry as *Sarracenia minor*. Dr. Wherry in his letter mentions the "white areoles" on the rear wall of this plant

and says "On the theory of natural selection it has been suggested that these white areas let light into the pitcher and thereby encourage insects to enter."

In the St. Louis region there are probably two generations each year. The wasps that overwinter in the cocoon are actively engaged in nest building early the following June, and on one occasion a nest gave forth four adults during the last week of July; this indicates two generations per year. One larva was seen to spin its cocoon on June 13, 1930. The cocoon is of silky texture and of a light cream color when spun, but it soon becomes dark brown and very leathery in texture. This change is probably due to the veneering of excrement that the inside of the cocoon receives, when the alimentary tract is emptied by the larva preparatory to pupating.

Chlorion harrisi is not exempt from parasites; from one cocoon a hymenopterous parasite *Eurytoma bicolor* Walsh (A. B. Gahan) emerged on June 6, 1930, and from another nest about a dozen specimens of a dipterous insect *Pachyophthalmus signatus* Say (J. M. Aldrich) emerged. The pupal cases of this fly were lodged among the wing remains of the Orthopterous prey. There was no evidence of a wasp cocoon present so the indication is that the fly larvae fed either on the orthopterous prey or on the wasp larvae and not on the wasp in the pupal stage. From another nest of *C. harrisi*, I obtained a dipterous cocoon, which eventually gave me an adult *Pachyophthalmus floridensis* (J. M. Aldrich). The parasitic enemies enter the nest while it is in course of construction. The tightly packed plug is placed at the entrance after the damage is done. There is also another type of damage unwittingly done to the population by other species of wasps that nest in the top portion of the twig. By building mud partitions at the top of the nest they make a living tomb of the *harrisi* population at the bottom, because the newly adult *Chlorion* wasps are unable to bite their way through the mud walls. A case of mortality of this kind was actually caused by the mud carrying Eumenid wasp, *Odynerus foraminatus*.

Notice.—Title page and Index for vol. 14, *Entomologica Americana*, are bound in with no. 4, vol. 14.